# PHASE III: DEVELOP

## INTRODUCTION

During this phase of curriculum development the training site(s) develop the content of the education and training program or course; specify the instructional delivery system, learning activities and methods of presentation that will be used; and select or develop the media that will be used. Figure 4-1 provides an overview of the development phase.

**DEVELOPMENT PROCEDURES**

DEVELOP CONTENT OUTLINE

SPECIFY LEARNING ACTIVITIES

SPECIFY PROGRAM/COURSE INSTRUCTIONAL DELIVERY SYSTEM

SELECT METHODS OF PRESENTATION

SELECT/DEVELOP INSTRUCTIONAL MEDIA
Student References
Instructional Materials: Teaching Aids, Learning Aids

PREPARE LESSON TOPIC GUIDES

REVIEW AND FIELD TEST MATERIALS

**Figure 4-1: Overview of Development Phase.**

The curriculum documentation completed in the design phase, especially the learning objectives from the curriculum outline, serve as input to the development phase. Decisions made in this phase of curriculum development are based on the learning objectives, just as the learning objectives were based on the analysis completed in the first phase.

The types of **learning activities** needed depend on the skills (cognitive or procedural) that students need to practice to meet the learning objectives.

The **methods of presentation** used depend on the type of information that will be presented and how students will use the information in meeting the

learning objectives. The **media** used depend on the methods of presentation and learning strategies selected, which in turn depend on the learning objectives.

The responsibility for the development phase rests with the training site. In most cases, the instructors of the program or course complete this phase, with assistance from an instructional systems specialist. The academic director (or training director) is responsible for ensuring that the decisions made during this phase of curriculum development are educationally sound and feasible under current resource constraints.

Training commands are encouraged to supplement this section through staff development and/or locally prepared guides on available methods of presentation, learning strategies, and media. Appendix 4A lists sources of information on instructional methods.

The output from this phase is reviewed and approved locally. The materials may be reviewed by headquarters personnel during on-site visits, inspections, or as needed to respond to queries from higher authority.

## CONTENT OUTLINE

The content outline covers the information that must be presented to students if they are to master the learning objectives in the lesson topic. This includes all of the facts, concepts, procedures, rules, theories, or principles that students must learn to master each learning objective. Include enough detail in the content outline for it to serve as the instructor's primary source for information about the content of the lesson topic. Base the content outline on the most current material available to you. If you use references other than those cited in the learning objectives, be sure that your material is not in conflict with the student references. The content outline is included in the lesson topic guide in a topic outline format.

## LEARNING ACTIVITIES

"Learning activities" is a generic term covering almost any structured event where the student is doing something that aids in mastering a learning objective. There are two key characteristics of learning activities.

**The first key is that students actively participate in the event.** A guided discussion is considered a learning activity because students must participate in the discussion. A lecture, by itself, is not considered a learning activity because students generally do not participate in the lecture. This does not mean that students cannot learn from a lecture, or that they are not involved in the lecture. Students are involved to the degree that they pay attention to the lecture and/or take notes, but their involvement is essentially passive. Similarly, a reading assignment by itself is not considered a learning activity. A reading assignment accompanied by study questions that must be completed by the student is considered a learning activity.

**It's important to recognize the limitations of essentially passive methods of presentation and make sure that some learning activity accompanies or follows the presentation.** Most people learn by using and applying knowledge and skills. Learning activities allow students to do so.

**The second key is that the learning activity must aid in mastering the learning objective(s) targeted.** This means that the learning activity must require students to use the appropriate knowledge and/or skills and use them in a way that is consistent with the behavior required in the learning objective(s). For example, a drill and practice exercise would be appropriate for a learning objective requiring students to state the chemical element represented by a particular abbreviation or symbol. Group discussion of scenarios and/or role playing would be appropriate learning activities for objectives focusing on development of students' interviewing skills.

Learning activities range from drill and practice exercises (e.g., to improve typing skills or learn symbols) to complex projects requiring students to

integrate a wide range of knowledge and skills. Whether the learning activity is simple or complex, students must receive feedback on their performance. Note that "feedback" and "grade" are not synonymous. Consider the study question example above. Going over the study questions in class provides feedback (students evaluate their answers against others and the input from the instructor) without providing a grade.

Learning activities may be specified for individual learning objectives or for combinations of learning objectives.

## PROGRAM/COURSE INSTRUCTIONAL DELIVERY SYSTEM

The program/course instructional delivery system refers to the way the course as a whole is presented; either as group-paced or self-paced instruction. **Group-paced instruction** is delivered in sequence and paced to suit the progress of the majority of the class. At this time, most of the training programs in the Navy Medical Department are group-paced. In **self-paced instruction**, students of different aptitudes can progress through the course or program at their own rate. The sequence of the program or course may also be variable, allowing students to choose their own path through the material. A self-paced program allows slower students to take more (but not unlimited) time for additional study and practice. Faster students finish more quickly.

Most self-paced programs are based on a mastery principle. All students are expected to meet the objectives and failure is virtually impossible. The variable is time; students may repeat the material as many times as needed to master it.

Cost-effectiveness is frequently the deciding factor between group- and self-paced instruction for a program as a whole. Several factors may add to the cost of self-paced instruction:

1. Development of self-paced materials is expensive, prohibitively so if the learning objectives or materials for the course must be revised with any frequency.

2. If practical or skills laboratories are needed, they must be available and staffed over longer periods of time.

3. The average student-to-instructor ratio over the program is usually lower than for group-paced instruction, requiring more instructors.

4. Multiple copies of any audiovisual materials must be available.

If training time is significantly shortened for most students (as is usually the case), the decrease in training time may offset these costs. With the increasing availability and decreasing cost of videoteletraining and computer-based training, including interactive multimedia materials, distance learning and self-paced modules are becoming more economical at the same time that traditional group-paced instruction is becoming more expensive.

From an educational point of view, self-paced instruction is not the best choice for learning objectives that require or encourage interaction among students. Self-paced instruction would not be appropriate for units where learning activities that require group participation predominate.

Note that sections of an education and training program may be self-paced even though the program as a whole is group-paced (e.g., requiring students to complete a self-paced module on anatomy by a particular date in a group-paced course). With increasing access to computers and computer-based materials, self-paced modules will probably become more common.

Likewise, self-paced courses may include group activities, but scheduling such activities in a truly self-paced program presents problems.

## METHODS OF PRESENTATION

"Methods of presentation" refer to the ways that the content (i.e., new material or information) of a lesson topic (or a segment of the lesson topic) can

be passed to students. The most common methods of presenting new information in a group-paced program or course are lectures, instructor demonstrations, and reading assignments. Self-paced instruction relies on methods of presentation that are individualized, usually with a heavy reliance on reading assignments and computer-based instruction. Computer-based instruction incorporates audiovisuals and text to present new information.

Selection of the method or combination of methods for presenting new material depends on:

- The type of content that supports the learning objective.
- The type of behavior that is required in the learning objective.
- How much students already know.
- The skills of the instructor.
- The resources available.

**The type of content to be presented and the type of behavior required in the learning objective(s)** are the primary factors in selecting the method of presentation. If a learning objective requires students to perform a procedure, include a demonstration of how to perform the procedure. If a learning objective requires students to determine whether or not a combination of medications is likely to produce a harmful drug interaction, a lecture and/or reading assignment may be the most efficient method of presenting the new material on medications and medication interactions.

Another factor is **how much students know.** If the content is totally unfamiliar to the students, a relatively passive method such as a reading assignment or a lecture is probably needed. If the content builds on previous knowledge from the course, a more active method, such as guided discussion, is probably desirable.

The **skills of the instructors** available must also be considered. Different methods of presentation require different skills, particularly when learning activities are tied to the presentation. Someone who is very good at

presenting a lecture may not be as skilled at leading a discussion or using a simulation. If time is available, staff development may overcome constraints in this area.

The **resources available** may limit the methods of presentation available. Unfortunately what is best and what is possible do not always overlap. If the most effective method of presentation calls for facilities, equipment, or personnel that are not available and cannot be obtained, an alternate method will have to be selected, even though it may be less effective.

## INSTRUCTIONAL MEDIA

"Instructional media" are the means of presenting new information and learning activities. Books, audio and video tapes, film, computer programs, student handouts, flash-cards, anatomical models, and drawings on a chalkboard are all media.

A combination of media can be used in conjunction with a single presentation. For example, an instructor may use drawings on a chalkboard or overhead transparencies, anatomical models, and student handouts to supplement a lecture. The same presentation can be delivered using different media. A lecture can be presented "live," on videotape, on audio tape, or even printed. Drill and practice exercises may be presented in a workbook or student handout, using flash cards, in a programmed text, or through a computer program.

Two basic rules apply to selecting or developing instructional media:

1. **Select or develop instructional media to meet the objectives of the education and training program.** Never construct or revise the course or program just to use some medium that happens to be available, be it a textbook or some new computer-based instruction.

2. **Do not reinvent the wheel.** If at all possible, use existing materials or revise existing materials to meet the needs of the program.

**CDG (TECH)** - Develop

Creating instructional media is time consuming and expensive. This is particularly true of audiovisual and computer-based media.

Include the following considerations when evaluating existing instructional media for use in an education and training program or course :

1. Does the material match the characteristics of the target audience?
2. Does the material fit the designated instructional delivery system?
3. Will the material be effective for the desired learning activities?
4. Does the depth and scope of the content match the depth and scope indicated by the learning objectives?
5. Does the content reflect current practice and policy?

If adequate instructional media are not available, new materials will have to be developed. The new material must meet the same criteria used to evaluate existing media.

## Student References

Student references (included under instructional media in Figure 4-1) are the authorities cited for correct performance in the learning objectives. Use publications or materials readily available to students for repeated study. Ideally, each student has continuous access to the student reference as long as it is applicable. This is most readily accomplished with printed materials. Other types of media must be supported by equipment, making it more difficult to provide continuous access for all students. If equipment-based media are used as student references, make sure that a learning center is available with sufficient equipment and copies to allow ready access.

## Instructional Materials

Instructional materials include **teaching aids** (items used primarily by the instructor to present material) and **learning aids** (items used primarily by students for practice or study). Films, slides, videotapes, and models are

teaching aids frequently used to supplement lectures or present new content. Flash cards, programmed texts, student handouts, computer-based instruction programs, and performance checklists may all be used as learning aids.

Whether an item is a teaching aid or a learning aid depends on its use at any given time. For example, an anatomical model serves as a teaching aid during an instructor demonstration and as a learning aid during a student practice session.

## LESSON CONSTRUCTION

| | |
|---|---|
| Introduction | ■ State the purpose and importance of the lesson<br>■ Explain the connection of the current lesson to previous lessons<br>■ Explain the connection of the current lesson to following lessons<br>■ Paraphrase and explain the learning objectives for the lesson |
| Present new information/content | ■ Use "advance organizers" for lectures or lengthy audiovisuals<br>■ Check for student comprehension during presentation where feasible<br>■ Check for student comprehension at conclusion<br>■ Summarize key point or concepts at conclusion |
| Provide examples of application and/or demonstrate skill | ■ Keep examples relevant to the focus of the lesson<br>■ Use examples relevant to target audience's experience<br>■ Make sure demonstrations are visible to all students |
| Learning activities and feedback | ■ Explain the purpose of the activity<br>■ Give clear directions for the activity<br>■ Make sure students understand directions<br>■ Make sure enough time is provided to complete the assignment<br>■ Provide feedback at conclusion of activity<br>■ Summarize key concepts at conclusion of activity |

**REPEAT**
**PRESENTATION - APPLICATION/DEMONSTRATION - STUDENT PRACTICE**
**AS NEEDED TO COMPLETE LESSON.**

| | |
|---|---|
| Review and summarize lesson | ■ Check for student comprehension on each learning objective<br>■ Review key points, concepts, skills<br>■ Review connection between current lesson, previous and upcoming lessons |

**Figure 4-2: Components of a Lesson.**

## LESSON CONSTRUCTION

Every lesson consists of the following basic components (see Figure 4-2):

1. An introduction.
2. The presentation of essential information.
3. A demonstration or examples of application.
4. Learning activities and feedback.
5. A summary or review of the lesson.

During the introduction, explain why the lesson is important, how previous segments of the course apply to the lesson, and how the material in the lesson will apply to other parts of the course. Placing the lesson in context is essential. If students understand the relevance of the material to the course as a whole, it's more likely that they will retain the material and use it in the rest of the course.

Paraphrase and explain the objectives. Make sure that students understand the objectives of the lesson.

The content outline prepared earlier in this phase is the basis for the presentation of essential material. Please note that a lesson and a lecture are not synonymous. The new content in a lesson may be presented in a lecture, integrated with a learning activity, or presented in reading assignments or other media. When new content is presented in a lecture, an "advance organizer" of some sort (usually a one-page outline of the material covered, with key points emphasized) should be given to the students.

Follow presentation of new information with an explanation of how the information is applied in different situations. For example, if the new information is a theory, give examples of the application of the theory. Make sure the examples connect to the experience of the students.

Learning activities may consist of exercises students complete individually, in groups, or both. Use increasingly complex and difficult learning activities and provide feedback to students.

In the summary or review of the lesson, emphasize the relationship of the current lesson to past and future parts of the course or program. Review the learning objectives, emphasizing the key points. Keep students as actively involved as possible during this review.

A single lesson will usually include several loops through the presentation, demonstration/application, and learning activities components. For curricula using the terminal and enabling objective structure, there may be one (or more) such loops for each enabling objective.

## LESSON TOPIC GUIDES

Lesson topic guides (also called instructor guides) are used by instructors to implement the education and training program. A master copy of the current lesson topic guide for each lesson topic in the education and training program or course will be maintained by the training site.

The master copy provides a minimum specification of what will be taught and how it will be taught. Instructors annotate their copy to emphasize certain areas, add alternate methods of presenting material, and add or expand examples or learning activities. Instructor annotations **must not** change the content, scope, or complexity of the lesson.

### Format

There is no single, required format for the lesson topic guide. The following sections provide guidance on the information to include on the cover sheet and in the body of the lesson topic guide.

## Cover Sheet

The cover sheet for the lesson topic guide includes the following information (as illustrated in Figure 4-3, page 4-15):

1. Course title.
2. Classification: Enter the appropriate security classification or "Unclassified."
3. Lesson topic number and title (may be shown as separate entries).
4. Allotted lesson time: Indicate the number of didactic, lab/practical, and/or clinical/field contact hours.
5. Student reference(s).
6. Instructional materials: All assignments, media (including equipment), and handouts that will be needed to conduct the lesson.
7. Assignment(s): May include assignments that will be completed in class as well as homework assignments.
8. Method of evaluating student achievement.
9. Learning objectives (usually shown on right hand side of cover sheet).
10. Date (month and year) that the lesson topic guide was implemented (usually shown in the upper right hand corner) or revised.

## Body

The body of the lesson topic guide includes the content outline, instructor activities, student activities, and instructor annotations. Figure 4-4 (page 4-16) illustrates three formats that may be used. Please note that other formats are acceptable; the three included in Figure 4-4 are the most common.

Present the content outline (i.e., what will be taught) in topic outline format, using learning objectives for the lesson topic as the major headings. Some training programs use two columns for the content outline, placing the objectives in one column and the topic outline in another. When this format is used, be careful to line up the objectives and the relevant parts of the topic

outline. Entries in the "Instructor Activities" column indicate what the instructor will do during each part of the lesson (e.g., "Elicit examples from students."). Instructors normally use this column to annotate the lesson topic guide, but a separate column may be included for annotations. Some programs add a column labelled "Student Activities" to indicate what students will do during each part of the lesson (e.g., "Complete Nursing Note practice exercise."). Keep the columns in the following order: learning objectives (if separate from the content outline), content outline, student activities, instructor activities, instructor annotations (if separate from instructor activities).

Most lesson topic guides are printed in landscape format (Figure 4-3 is in landscape format), but portrait format (this page is in portrait format) is also acceptable.

MAR 1994; rev'd JAN 1995

SURGICAL TECHNOLOGIST COURSE

UNIT: 1.0 Fundamentals

LESSON TOPIC: 1.4 Surgical Terminology

CLASSIFICATION: Unclassified.

ALLOTTED LESSON TIME:
2.0 Didactic contact hrs
0.0 Laboratory contact hrs

STUDENT REFERENCES:

Young's **Learning Medical Terminology**
**Medical Terminology: A Programmed Text**

INSTRUCTIONAL MATERIALS:
Student Handouts - Information Sheet 1.4.1
Instructional Aids - Chalkboard

EVALUATIONS: Written Test 1.4

HOMEWORK: Practice Exercises 3, 4, & 5 in YOUNG'S

TERMINAL OBJECTIVE: Given a surgical schedule, define surgical procedures IAW Information Sheet 1.4.1 and with a minimum of 75% accuracy.

ENABLING OBJECTIVES: Performance will be IAW Young's **Learning Medical Terminology** and **Medical Terminology: A Programmed Text**. A minimum of 80% accuracy overall is required.

1.4.1 Given a list of prefixes, suffixes and root words related to operating room procedures, state the definition for each.

1.4.2 Define selected surgical procedures from Information Sheet 1.4.1.

**Figure 4-3: Sample Cover Page for Lesson Topic Guide.**

## Sample Formats

<<Course Title>>
<<Date>>
<<Unit Number and Title>>
<<Lesson Topic Number and Title>>

| Content Outline | Instructor Activities |
|---|---|
| <<Use topic outline format; include learning objectives as topic headings.>> | <<Includes instructor activities and space for personalization.>> |

**Two-Column Format**

---

<<Course Title>>
<<Date>>
<<Unit Number and Title>>
<<Lesson Topic Number and Title>>

| Learning Objectives | Content Outline | Instructor Activities |
|---|---|---|
| <<Learning objectives; line up with relevant content.>> | <<Use topic outline format.>> | <<Includes instructor activities and space for personalization.>> |

**Three-Column Format**

---

<<Course Title>>
<<Date>>
<<Unit Number and Title>>
<<Lesson Topic Number and Title>>

| Learning Objectives | Content Outline | Student Activities | Instructor Activities |
|---|---|---|---|
| <<Learning objective; line up with relevant content.>> | <<Use topic outline format.>> | <<List student learning activities.>> | <<Includes instructor activities and space for personalization.>> |

**Four-Column Format**

---

**Figure 4-4: Sample Formats for Body of Lesson Topic Guides.**

## REVIEWING AND TESTING MATERIALS

Review the material for each lesson topic with subject matter experts, focusing on the following questions:

1. Does all of the material support the learning objectives for the lesson? Is the material sufficient to meet the learning objectives?

2. Is the material technically correct?

3. Is all of the material consistent? If inconsistencies do exist, can they be corrected in the media or easily resolved for the student?

4. Are the learning activities consistent with real-world applications?

If possible, hold individual and group trials to field test new materials. Ideally, both should be used. In reality, it may be impossible to arrange either.

**Individual trials** involve using the materials in a one-to-one situation. The developer uses the materials with one person at a time. The person acting as the student should be similar to the students who would be taught the lesson. This means that he or she should have the same level of background knowledge and skills that a regular student would have at the beginning of the lesson. The "student" is free to comment on or question the materials as he/she works through the lesson. A number of individual trials may be needed to weed out the major flaws.

**Group trials** are similar, but now the "students" go through the material without interruption. After completing the segment, they are questioned about their reactions to the materials. Again, revisions are made, new trials run, more revisions made, and so on, until the developer is confident that the material works.

The major difficulty in field testing materials is finding people with the right level of knowledge and skill to act as "students." Despite the difficulties, every attempt must be made to arrange individual and/or group trials. The alternative is to use the untried materials during the first pilot implementation. If the new materials are faulty, the consequences could include failing students

because the materials do not work or graduating students who have not been adequately prepared.

**As a minimum**, new materials must be reviewed with subject matter experts to check content questions, and an instructional systems specialist to check the adequacy and appropriateness of the materials for effective instruction. In addition, edit all materials developed for the lesson.

When all of the lesson topic materials have been individually reviewed, the materials for the course or program as a whole must be reviewed for consistency.

Once the reviews and field testing are completed, the course or program is ready for pilot implementation (covered under Phase IV: Implementation).